

**Emergency Lighting Design Evaluation
Specifically Relating to Exhibits B-16, B-1, B-8, and B-7
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1. General Overview

This report evaluates the product designs of exhibits B-16, B-1, B-8, and B-7. These designs are evaluated both independently, as well as in relationship to each other and with other emergency lighting products found in the marketplace.

2. B-16 Design Description

Image



Description

B-16 can be classified as an integrated emergency light with adjustable optics powered by incandescent lamps.

Overall Design

This overall design of this product demonstrates a minimalist aesthetic design. Generally, the product is devoid of ornate features. The forms and surfaces utilized are simple and clean for a classic aesthetic and an unobtrusive appearance.

The exterior components of the product are generally made of thermoplastic material of similar color and mild texture. The only notable exceptions are the translucent lenses and the red test button and indicator LED.

Main Housing

The main housing comprises of a rectangular prism with two additional facets. From a top view, the overall profile is substantially similar to an isosceles trapezoid. The two facets are situated in such a manner as to allow the lighting heads to be recessed relative to the front face of the housing. In addition, the angled facets allow the lighting heads to be naturally positioned at an angle to the front face to create a wider spread of the light given from the lighting heads.

All of the faces of the main housing are substantially flat. Simple small rounds are used to soften edges. A mild texture is used to minimize glare, add aesthetic appeal, and to hide minor blemishes in the housing such as stink marks. The part line for the main house is substantially hidden from view when the product is installed, which is aesthetically desirable.

Back Plate

A back plate is used to complete the rear of the main house and to allow easy installation. This back plate is constructed of plastic similar in color and texture to the main housing. In order to facility the removal of the main housing after installation, such as to remove or maintain the fixture, the back plate contains two trapezoidal attachment tabs along the bottom surface. The main housing has mating recesses to accept these two trapezoidal attachment tabs. To disassemble the main housing from the back plate, a screwdriver or similar device can be used to pry open and release the tabs. These tabs could be designed in any number of shapes, but the trapezoidal shape creates aesthetic design constancy with the faceted shape of the main housing.

Lighting Heads

The design of the lighting heads can be described as an extruded parabolic surface with proportionality nearly approaching that of an extruded half cylinder. The edges of the extruded shape are heavily rounded to soften the overall shape. The front face of the lighting heads is predominantly square with heavily rounded corners. The light heads utilize an incandescent lamp enclosed on the front side with a removable translucent lens. The lens contains numerous prismatic contours to aid in the direction and dispersion of light to the area of interest. From a side profile, the lens has a noticeably domed surface.

Lighting Head Articulation

Each lighting head is attached to the main housing using a multi-directional articulation joint. This joint has two degrees of motion. The first allows the lighting head to rotate about an axis perpendicular to the facet on which it is mounted. The Second allows the lighting head to rotate about an axis that is parallel with the parabolic extruded profile of the lighting head.

The articulation joint allows the lighting heads to be positioned independently in a multitude of positions in order to direct light to different areas of interest when the product is in use. The ratchet mechanism allows the lighting head to hold its position against gravity and other forces after the lighting head is positioned by a user. The ratchet also provides audible and tactile feedback to the user while the lighting head is being positioned.

3. B-1 Design Description

Image



Description

B-1 can be classified as an integrated emergency light with adjustable optics powered by halogen lamps.

Overall Design

This overall design of this product demonstrates a minimalist aesthetic design. Generally, the product is devoid of ornate features. The forms and surfaces utilized are simple and clean for a classic aesthetic and an unobtrusive appearance.

The exterior components are generally made of thermoplastic material of similar color and mild texture. The only notable exceptions are the translucent lenses and the red test button and indicator LED.

Main Housing

The main housing is identical to that used on B-16

Back Plate

The back plate is identical to that used on B-16

Lighting Heads

The design of the lighting heads can be described as an extruded parabolic surface with proportionality nearly approaching that of an extruded half cylinder. The edges of the extruded shape are heavily rounded to soften the overall shape. The front face of the lighting heads is predominantly square with heavily rounded corners.

The lighting heads utilize an MR16 halogen lamp. This lamp type has an integrated lens. The front of the lighting head enclosure is finished with a cosmetic opaque bezel, which matches the color and texture of the rest of the lighting head assembly. Although the lamp itself has a flat lens, the cosmetic bezel has a noticeably domed surface when viewed from a side profile.

Lighting Head Articulation

The lighting head articulation assembly is nearly identical to that used on B-16. The only noticeable difference is that the attachment joint is sized appropriately to accommodate the smaller radiused curvature on the backside of the lighting head housing. The functionality of the mechanism is identical to that used on B-16.

4. B-8 Design Description

Image



Description

B-8 can be classified as a single remote emergency light with adjustable optics powered by an incandescent lamp.

Overall Design

This overall design of this product demonstrates a minimalist aesthetic design. Generally, the product is devoid of ornate features. The forms and surfaces utilized are simple and clean for a classic aesthetic and an unobtrusive appearance.

The exterior components of the product are generally made of thermoplastic material of similar color and mild texture. The only notable exception is the translucent lens.

Main Housing

The main housing comprises of a rectangular prism with two additional facets. The surface of the facets is not flat, but instead has a gentle curvature in one direction. The two facets soften the overall shape of the house and give it a smaller and less obtrusive profile. The facets do not have a noticeable function.

All of the faces of the main housing, with the exception of the facets, are substantially flat. Simple small rounds are used to soften edges. A mild texture is

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used to minimize glare, add aesthetic appeal, and to hide minor blemishes in the housing such as stink marks. The part line for the main house is substantially hidden from view when the product is installed against a wall or similar surface.

Back Plate

This design does not use a back plate.

Lighting Head

The lighting head is identical to that used on B-16.

Lighting Head Articulation

The lighting head articulation assembly is identical to that use on B-16

5. B-7 Design Description

Image



Description

B-7 can be classified as an integrated emergency light with fixed optics powered by incandescent lamps.

Overall Design

This overall design of this product demonstrates a minimalist aesthetic design. Generally, the product is devoid of ornate features. The forms and surfaces utilized are simple and clean for a classic aesthetic and an unobtrusive appearance.

The exterior components of the product are generally made of thermoplastic material of similar color and mild texture. The only notable exceptions are the translucent lenses and the red test button and indicator LED.

The overall shape of the design is a rectangular prism with two additional facets. Integrated lighting lenses are situated at the facets, allowing for a favorable light spread during operation. From a top view, the overall profile is substantially similar to an isosceles trapezoid.

Main Housing

The shape of the main housing comprises of a frame shaped as a rectangular prism with two additional facets. From a top view, the overall profile is substantially similar to an isosceles trapezoid with two recesses to accept lenses on each end of the housing. All of the faces of the main housing are substantially flat. Simple small rounds are used to soften edges. A mild texture is used to minimize glare, add aesthetic appeal, and to hide minor blemishes in the housing such as stink marks. The part line for the main house is substantially hidden from view when the product is installed, which is aesthetically desirable

Back Plate

A back plate is used to complete the rear of the main house and to allow easy installation. This back plate is constructed of plastic similar in color and texture to the main housing. In order to facilitate the removal of the main housing after installation, such as to remove or maintain the fixture, the back plate contains two trapezoidal attachment tabs along the bottom surface. The main housing has mating recesses to accept these two trapezoidal attachment tabs. To disassemble the main housing from the back plate, a screwdriver or similar devise can be used to pry open and release the tabs. These tabs could be designed in any number of shapes, but the trapezoidal shape creates aesthetic design constancy with the faceted shape of the main housing.

Lighting Lenses

Two lighting lenses are incorporated into the assembly and are situated in a symmetrical arrangement on the left and right sides of the main housing. The lenses and related optics are fixed and do not articulate. However, the lenses are removable from the front of the product such that the lighting lamps can be replaced after the product has been installed.

When installed, the lenses complete the overall aesthetic form of the assembly. Although the lenses are constructed of a translucent plastic, which differs from the colored opaque plastic of the main housing, the lenses are shaped in such a manner as to continue the overall form of the assembly. The exterior surfaces of the lenses are substantially flat while the interior surfaces are prismatic to facility the proper dispersion of light.

6. Family Language Design Evaluation

B-1, B-7, B-8, and B-16 have all been designed in coordination to create a unifying family language. This family language is very versatile and may extend to additional products not evaluated in this report. Family languages are often used by product manufactures for their numerous advantages. These advantages include building brand equity in an aesthetic design, creating product recognition in the marketplace, leveraging manufacturing and design efficiencies, simplifying manufacturing and

logistics through commonality of parts, and improved aesthetics through similarly styled products in multiple applications.

Integrated Units With Articulating Optics

B-1 and B-16 are very similar in design. Both products utilize identical main housing and back plate designs. In addition, both products use identical methods for attaching and articulating the lighting heads. This allows both products to utilize the same processes for installation, lighting adjustment, testing, and servicing.

B-1 and B-16 do differ in the design of their respective lighting heads. B-1 utilizes a type MR16 halogen lamp with a small-integrated lens. B-16 utilizes an incandescent lamp in conjunction with a large removable lens. Although the designs of the two different lighting heads are not identical in size or construction, they do share several predominant features. First, they share the same ratchet style articulation mechanism. Second the shape of the housing is substantially similar, comprising of an extruded parabolic shape with heavy rounds. In addition, the front faces of the light heads share a similar front profile, which can be described as substantially square with heavily rounded corners. Finally, the front surfaces of both lighting head designs have a moderate dome when viewed from a side profile.

Remote Heads with Articulating Optics

B-8 shares many of the main features with B-1 and B-16. The lighting head design utilized in B-8 is identical to the lighting head design used on B-16. In addition the ratchet style articulation mechanism is identical to the mechanism used on B-1 and B-16. Finally, the shape of the main house is substantially similar to the shape of the main housings use in B-1 and B-16. Although the size and proportions differ, B-8, B-1, and B-16 all utilize a faceted rectangular prism shape for the main housing with a top profile that is similar to an isosceles trapezoid. It should be noted that the facets on the B-8 main housing design are slightly curved while the facets on B-1 and B-16 designs are substantially flat.

Integrated Unit with Fixed Optics

Since it has fixed optics, B-7 does not contain the same lighting head designs and articulation mechanisms found on B-1, B-16, and B-8. However, B-7 does utilize a faceted rectangular prism shape for the main housing with an top profile that is similar to an isosceles trapezoid, which is consistent with the designs of B-1, B-16, and B-8. In addition, all of the integrated units evaluated (B-7, B-1, and B-16) utilize the same trapezoidal release tabs to attach the back plate to the main housing. This creates a similarity in assembly, installation and servicing across all of the integrated units evaluated (B-7, B-1, B-16).

7. Unique Design Features

There are numerous designs for emergency lighting products present in the marketplace. This profusion of designs represents a wide variety of colors, shapes,

forms, textures, and overall aesthetics. Images of a variety of these designs can be found in the Appendix.

Substantially Square Profile Lighting Heads

Wall mounted integrated emergency lighting units typically have two lighting heads. Units with adjustable heads can typically be classified into the two categories, top-mounted optics and side-mounted optics. B-1 and B-16 are examples of units with side-mounted optics. An example of a unit with top-mounted optics is shown in Fig 20.

In the marketplace, wall-mounted integrated emergency light units with side-mounted optics are very common. These units are aesthetically pleasing since the side-mounted optics produce a lower overall profile, thus decreasing the visually obtrusiveness of the unit.

Among these units, the profile of the lighting head assembly is predominately round. This is due to the naturally round shape of the lamps and lenses. Examples of units with round lighting heads are contained in Fig 1 – 4, Fig 7 – 8, Fig 10 – 16, and Fig 19.

In addition to B-16, only one other example of a side-mounted optics design was found in the marketplace with rectangular optics, which is shown in Fig 18. Although the unit shown in Fig 18 demonstrates a lighting head design similar to B-16, they differ significantly in that the front profile of the lighting heads found on B-16 are substantially square in proportion while the lighting heads found in Fig 18 are elongated rectangles. No examples were found of side-mounted optics units with substantially square lighting heads in front view.

Trapezoidal Shaped Attachment Tabs

B-16, B-1, and B-7 all utilize a common system of trapezoidal shaped tabs to attach the back plate to the main housing. These tabs could be designed in any number of shapes, but the trapezoidal shape creates a harmonious constancy with the faceted shape of the main housing.

This type of attachment tab is very uncommon among emergency lighting units. Other designs accomplish this same functionality in a variety of ways. The designs shown in Fig 1 – 3 utilize two round tabs on the bottom of the main housing. The design shown in Fig 11 uses exposed hinges and exposed fasteners. Other designs use hidden fasteners and tabs that are not directly visible after the units have been installed.

Two notable exceptions are the designs shown in Fig 9 and Fig 10. These units contain trapezoidal shaped attachment tabs that are similar in design to those used on B-16, B-1, and B-7.

Please note that the evaluation of the attachment tabs designs utilized in various units was made using product images and specification sheets. It was not always possible to gain a thorough understanding of the design of the attachment tabs through these materials.

Main Housing with Faceted Rectangular Prism

B-16, B-1, B-8, and B-7 all exhibit the same overall shape for the main housing which can be described as a faceted rectangular prism shape with a top profile that is similar to an isosceles trapezoid. These designs are also generally devoid of ornamentation. In addition, these main housing designs generally utilize flat surfaces with small rounded corners.

Emergency lighting design found in the marketplace exhibit a wide variety of shapes and forms. This includes organic and heavily contoured designs such as those found in Fig 1 – 3 and Fig 16. Other designs use large curved surfaces, such as those found in Fig 4, Fig 17, and Fig 19. Still other designs utilize block shapes, such the design represented in Fig 18.

Some designs exhibit main housing shapes that similar to B-16 and B-1. The design shown in Fig 7 is similar, but differs significantly in that it uses heavily contoured surfaces to form the facets. B-16, B-1, and B-7 use substantially flat surfaces to form the facets. The design shown in Fig 9 is similar, but differs significantly in that it uses heavy ornamentation and heavily textured surfaces along the front area of the housing. B-16, B-1, and B-7 are generally devoid of ornamentation and have substantially flat surfaces. The designs found in Fig 13 - 14 exhibit a top profile similar to an isosceles trapezoid, but differ in the proportion of the facet areas in relationship to the size of the rest of the housing.

Two notable exceptions are the designs shown in Fig 5 and Fig 6. These units exhibit main housing designs that are similar in shape and proportion to those found on B-16 and B-1.

Lighting Head Articulation Joint Design

B-16, B-1, and B-8 all utilize a common system of attaching the lighting heads to the main housing that allows for multi-directional articulation. The joint used in this system has two degrees of motion. The first allows the lighting head to rotate about an axis perpendicular to the facet on which it is mounted. The second allows the lighting head to rotate about an axis that is parallel with the parabolic extruded profile of the lighting head.

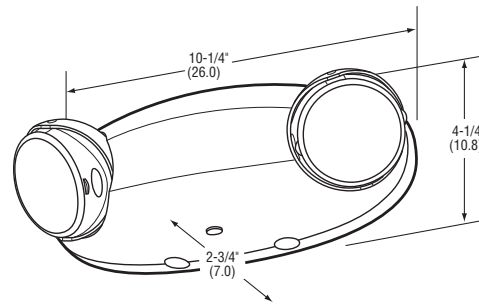
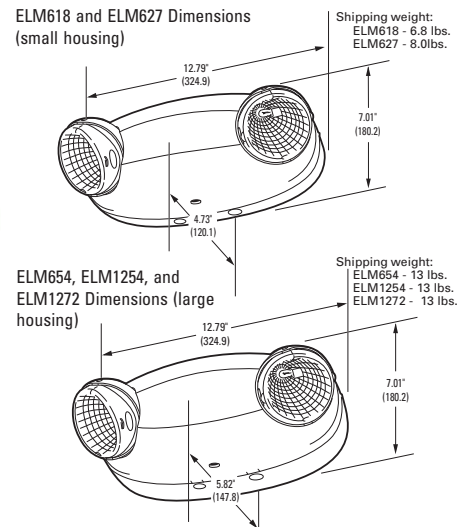
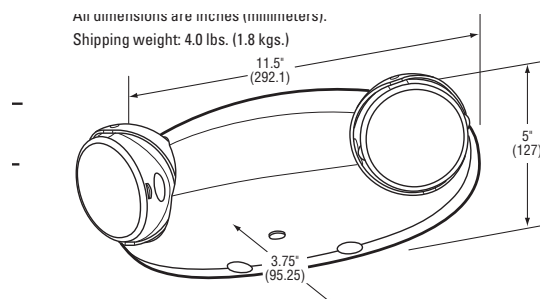
This articulation joint allows the lighting heads to be positioned independently in a multitude of positions in order to direct light to different areas of interest when the product is in use. The ratchet mechanism allows the lighting head to hold its position against gravity and other forces after the lighting head is positioned by a user. The ratchet also provides audible and tactile feedback to the user while the lighting head is being positioned.

The use of articulated joints to mount lighting heads is not uncommon among units found in the marketplace. However, the use of a ratchet mechanism that also provides audible and tactile feedback to the user may be unique.

From the examples examined in this report, only the design shown in Fig 6 demonstrates articulation joint features similar to those utilized in B_16, B-1, and B-8. However, please note that the evaluation of the articulation joint designs utilized in various units was made using product images and specification sheets. It was not always possible to gain a thorough understanding of the design of the attachment tabs through these materials.

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8. Appendix: Images*Fig1* Lithonia ELM2 LED*Fig 2* Lithonia ELM6-12*Fig 3* Lithonia ELM-ELM2

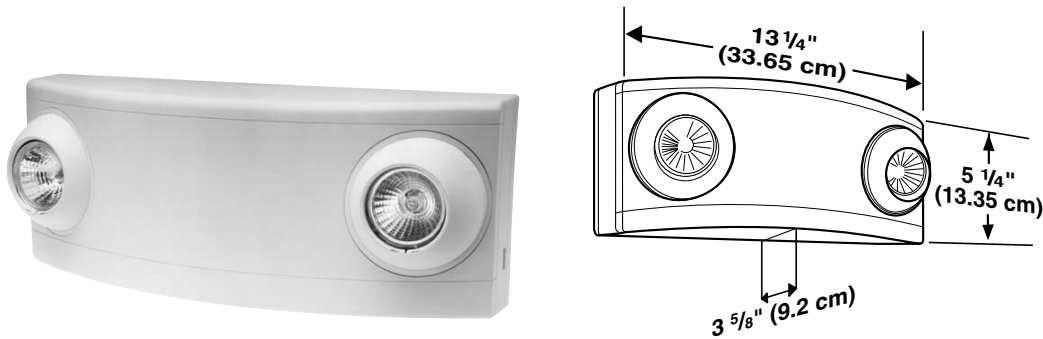


Fig 4 Dual Light LZ Series

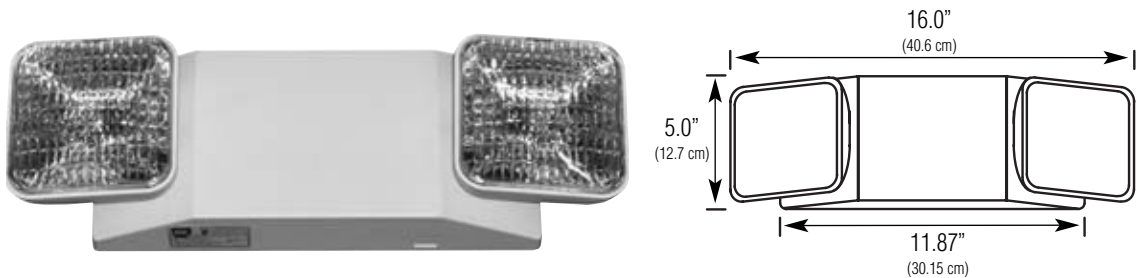


Fig 5 Chloride Systems GM2/GM3 Series

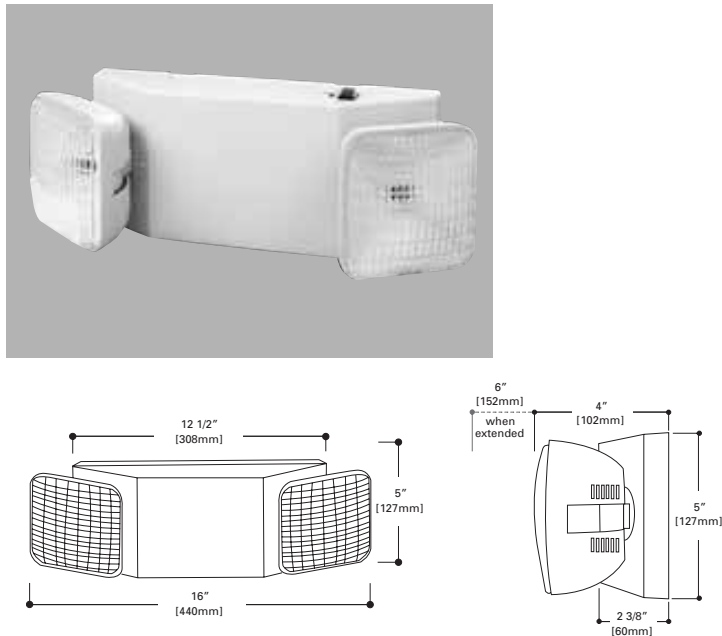


Fig 6 Cooper Lighting AP2SQ Series

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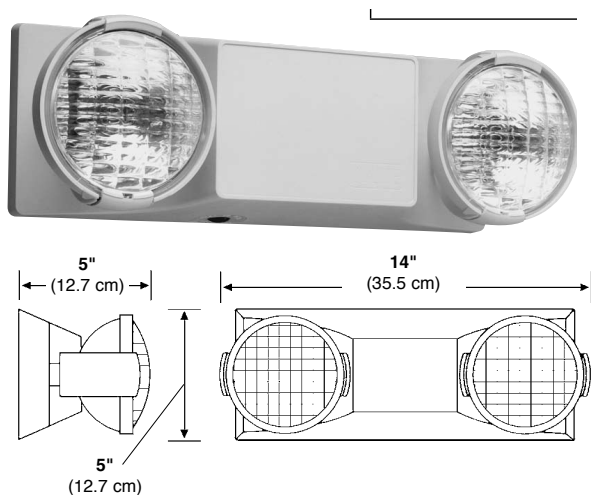


Fig 7 Dual Light EZ-2 series



Fig 8 TATCO 70012

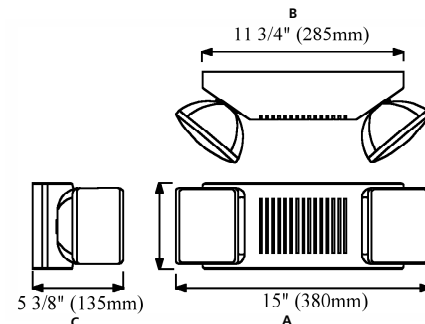


Fig 9 Progress Lighting pe007-30



Fig 10 Simplicity EXIT-PAR-1



Fig 11 Lithonia IND12100

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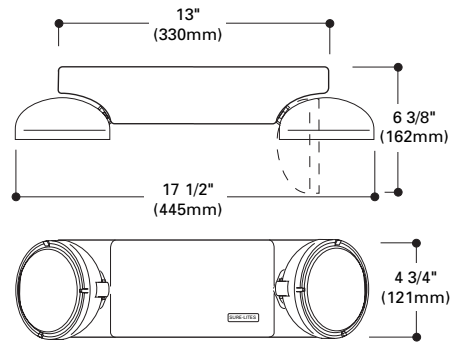


Fig 12 Cooper Lighting CC3, CC4, CC5, CC6

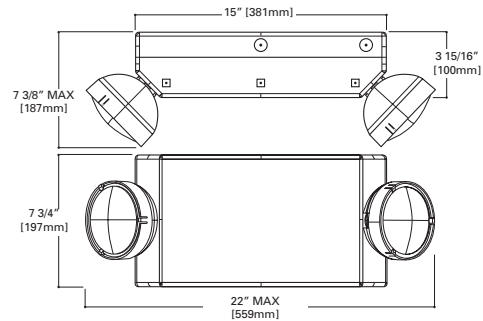


Fig 13 Cooper Lighting CC8 Series

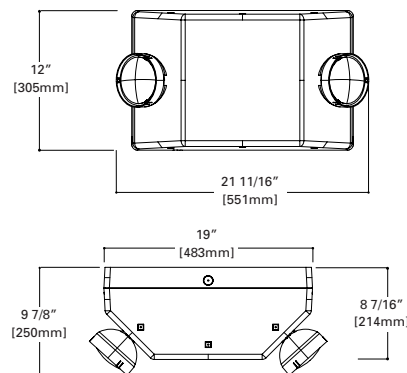


Fig 14 Cooper Lighting CC9, CC10, CC11, CC12

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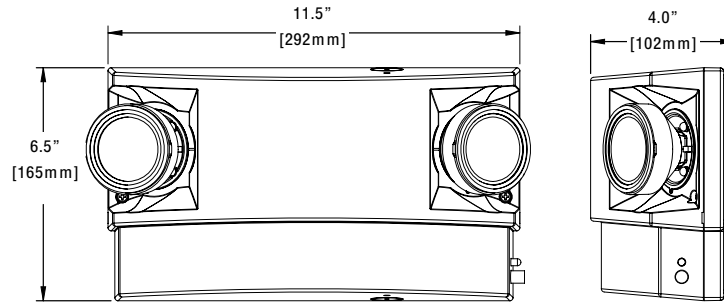


Fig 15 Cooper Lighting CHEL

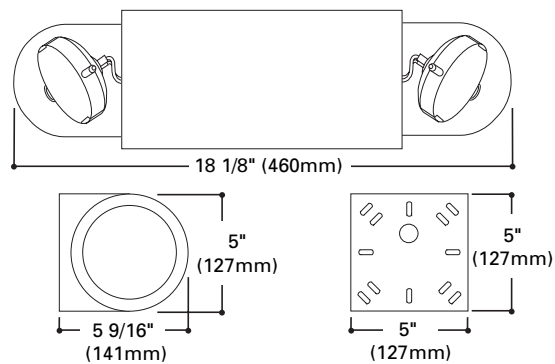


Fig 16 Cooper Lighting CU1

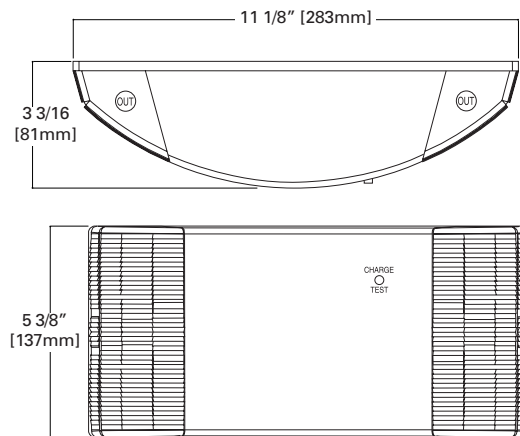


Fig 17 Cooper Lighting CU2

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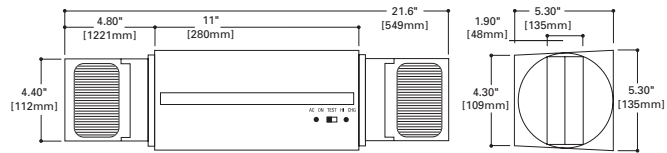


Fig 18 Cooper Lighting ML

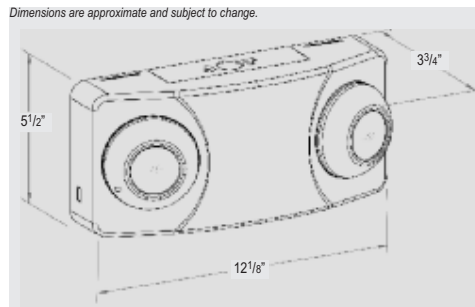


Fig 19 Lightalarms LCA-2MRS Series

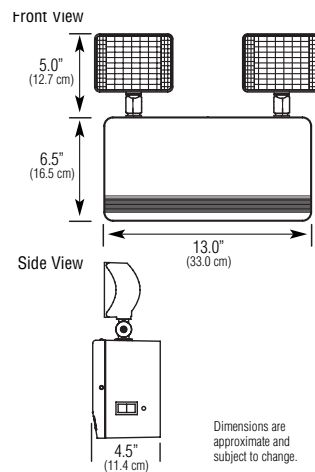


Fig20 Chloride Systems 6MF/12MF Series